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Industry Series

Preliminary Report

## Copper Ores

SIC 1021

This report presents preliminary information for the Copper Ores Industry from the 1977 Census of Mineral Industries. The data will be superseded by a final paperbound report which, in turn, will be bound into a volume of Subject, Industry, and Area Statistics of the 1977 Census of Mineral Industries. The final report will include a comprehensive discussion of the concepts and definitions used in the census.

The total value of shipments for establishments classified in the Copper Ores industry amounted to \$1,856 million in 1977, an increase of 17 percent over 1972. The value of shipments of products classified as being primary to the Copper Ores industry was \$1,707 million, an increase of 11 percent from 1972. (See appendix A for a discussion of the difference between value of shipments for the industry and value of product shipments.) Value added by mining, at \$1,067 million in 1977, was 4 percent above value added in 1972. All dollar figures shown in this report are in current dollars; therefore, they are not adjusted for changes in price levels.

In 1977 the industry had 32.2 thousand employees, a decrease of approximately 12 percent from 1972.

The Copper Ores industry includes establishments primarily engaged in mining, milling, or otherwise preparing copper ores. This industry also includes establishments primarily engaged in the recovery of copper concentrates by precipitation and leaching of copper ores. Establishment data in this report were tabulated based on industry definitions contained in the 1972 Standard Industrial Classification (SIC) Manual and its 1977 Supplement.<sup>1</sup>

Of the four tables, 1, 2, and 4 present data for establishments classified in the Copper Ores industry, reflecting not only the primary activities of the establishments, which determine their industry classification, but also all secondary activities performed in the same establishments. This fact should be taken into consideration when comparing these data with the value of products information appearing in table 3, reflecting the products classified as being primary to this industry and made by plants classified in this and other mining industries.

The methods of data collection and use of administrative records data are discussed in detail in appendix A. Small single-unit companies with up to 10 employees (the cutoff varied by industry) were excluded from the mail portion of the census. For these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated), data on payrolls and receipts were obtained from administrative records of other government agencies. The remaining statistics were developed from industry averages. For the Copper Ores industry, the establishments for which administrative records data were used accounted for less than 1 percent of total value of shipments.

<sup>1</sup> Standard Industrial Classification Manual: 1972. For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 4101-0066. Price \$6.75. 1977 Supplement. Stock No. 003-005-00176-0. Price 90 cents.



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Table 1. Industry Statistics: 1977 and Earlier Years

(For explanation of terms, see appendix B)

Year	Oper- ating com- panies (no.)	All establishments		All employees		Production, development, and exploration workers			Cost of supplies used, purchased machinery installed, etc.						Value of net shipments (million dollars)	Quantity of primary products <sup>1</sup> (million s. tons)	Capital expendi- tures (million dollars)
		Total (no.)	With 20 employ- ees or more (no.)	Number (1,000)	Payroll (mil. dol.)	Number (1,000)	Hours (mil- lions)	Wages (mil. dol.)	Value added in mining (million dollars)	Value of shipments (million dollars)	Value of net shipments (million dollars)						
INDUSTRY 1021, COPPER ORES																	
1977 <sup>2</sup> .....	63	130	63	32.2	527.2	23.0	43.8	356.1	1,066.6	997.4	1,856.2	(D)	239.3	207.8			
1972 <sup>2</sup> .....	110	181	71	36.4	386.8	27.8	56.4	279.2	1,025.3	772.5	1,588.5	(D)	261.1	209.2			
1967 <sup>2, 3</sup> .....	(NA)	156	62	20.9	170.9	15.0	32.5	114.6	436.5	361.6	675.9	561.5	127.5	122.1			
1963 <sup>2</sup> .....	118	160	41	26.5	187.3	21.4	45.3	142.4	417.1	340.2	670.2	544.2	145.3	87.1			
1958 <sup>4</sup> .....	112	148	38	27.6	143.5	20.9	41.0	106.4	266.5	236.0	457.6	374.4	112.0	44.9			
1954 <sup>5</sup> .....	179	210	41	27.8	136.1	21.5	46.7	98.5	334.9	256.1	508.7	409.9	91.0	82.2			

Note: For data prior to 1954 see 1963 Census of Mineral Industries, vol. I, table 1 of industry chapter.

(D) Withheld to avoid disclosing figures for individual companies. (NA) Not available.

<sup>1</sup>1963 data include ores valued chiefly for copper produced in other industries. 1977, 1972, and 1967 data represent ore produced in all industries but placed in industry of greatest metal value.<sup>2</sup>In 1977, 1972, and 1967, data for establishments without paid employees were not collected in the census. In 1963, 41 establishments without paid employees accounted for less than 1 percent of value added.<sup>3</sup>Data reflect a substantial decrease in activity caused by a labor strike during most of the second half of 1967 which affected all but a few copper mining and milling operations.<sup>4</sup>Excludes data for 9 establishments in Alaska with 6 employees.<sup>5</sup>Excludes data for 2 establishments in Alaska with less than 15 employees.

Table 2. Industry Statistics by Geographic Areas: 1977 and 1972

(Data withheld to avoid disclosing figures for individual companies)



Table 3. Products—Quantity and Value of Shipments by Geographic Areas: 1977 and 1972

(Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of the products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation see appendix B, Value of shipments)

1977 product code	Product and geographic area	Unit of measure	1977			1972		
			Quantity of pro- duction for all purposes	Product shipments		Quantity of pro- duction for all purposes	Product shipments	
				Quantity	Value (million dollars)		Quantity	Value (million dollars)
	COPPER ORES							
	UNITED STATES							
1021- --	Total.....		(X)	(X)	1,706.7	(X)	(X)	1,532.9
10211 --	Crude copper ores.....	Million s. tons.	239.3	(D)	(D)	261.1	74.0	220.4
10211 01	Crude ores mined.....		239.3	(X)	(X)	261.1	(X)	(X)
10211 03	From underground operations.....		25.1	(X)	(X)	34.5	(X)	(X)
10211 05	From open-pit operations.....		214.2	(X)	(X)	226.6	(X)	(X)
10211 2-	Ores and residues shipped to smelters and mills.....		(D)	(D)	(D)	74.0	74.0	220.4
10211 21	To smelters.....		(D)	(D)	(D)	(D)	(D)	(D)
10211 23	To mills.....		(D)	(D)	(D)	(D)	(D)	(D)
10212 01	Copper concentrates.....		5.2	5.2	1,310.2	5.8	5.9	1,102.0
10213 01	Copper-water precipitates, including precipitates from ores leached in place.....		.2	.2	125.0	.3	.3	204.0
10213 03	Electrowon copper recovered from leaching operations.....	Million s. tons.	(D)	(D)	(D)	(D)	(D)	(D)
10210 00	Copper ores, n.s.k.....		(X)	(X)	5.0	(X)	(X)	6.5
	NEW MEXICO							
10212 01	Copper concentrates.....	Million s. tons.	.7	.7	135.7	(NA)	(NA)	(NA)
	ARIZONA							
10212 01	Copper concentrates.....		2.9	3.0	754.0	5.5	5.6	1,023.4
10213 01	Copper-water precipitates, including precipitates from ores leached in place.....	Million s. tons.	.1	.1	77.7	(NA)	(NA)	(NA)

(D) Withheld to avoid disclosing figures for individual companies. (X) Not applicable. (NA) Not available.

Table 4. Selected Supplies and Fuels Used, Minerals Received for Preparation, and Purchased Machinery Installed: 1977 and 1972

(Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation see appendix B, Cost of supplies used, purchased machinery installed, etc. and Specific supplies used and minerals prepared)

1977 mate- rial code	Item	Unit of measure	1977		1972	
			Quantity	Delivered cost (million dollars)	Quantity	Delivered cost (million dollars)
	INDUSTRY 1021, COPPER ORES					
	Selected supplies and fuels used, minerals received for preparation, and purchased machinery installed.....		(X)	834.2	(X)	659.9
100091	Selected supplies used, minerals received for preparation, and purchased machinery installed.....		(X)	762.7	(X)	636.9
	Minerals received for preparation:					
	Crude ores and residues.....	Million s. tons.	(D)	( <sup>1</sup> )	73.9	220.1
	Crude ores mined and prepared at same establishment.....	Million s. tons.	177.3	(X)	182.9	(X)
353011	Purchased machinery installed.....		(X)	215.4	(X)	147.1
	Supplies used:					
241100	Round or hewn wood products and stumpage.....		(X)	7.1	(X)	4.8
289211	Explosive materials, except ammonium nitrate.....	Million lbs.....	38.9	7.2	54.1	5.5
289212	Ammonium nitrate.....	Million lbs.....	164.3	11.0	171.3	6.9
289214	Blasting accessories.....		(X)	4.5	(X)	3.9
331201	Steel mill shapes and forms.....		(X)	84.4	(X)	30.8
970099	All other supplies.....		(X)	<sup>1</sup> 431.6	(X)	213.8
974000	Undistributed supplies used, minerals received for preparation, and purchased machinery installed <sup>2</sup> .....		(X)	1.4	(X)	3.9
	Fuels used.....		(X)	71.5	(X)	23.0
121005	Coal--bituminous, lignite, and anthracite.....	1,000 s. tons...	(D)	(D)	(D)	(D)
	Fuel oil:					
291141	Distillate (light) grade numbers 1, 2, and 4 and light diesel fuel.....	1,000 barrels...	2,067.0	32.1	2,119.5	10.6
291151	Residual (heavy) grade numbers 5 and 6 and heavy diesel fuel.....	1,000 barrels...	(D)	(D)	258.2	1.2
131157	Gas--natural, manufactured, and mixed.....	Billion cu. ft..	16.8	18.7	16.1	8.0
291111	Gasoline.....	Million gal....	5.9	3.0	6.5	1.5
960018	Other fuels--liquefied petroleum gas, coke, wood, and other.....		(X)	1.0	(X)	1.3
977000	Undistributed fuels <sup>2</sup> .....		(X)	.3	(X)	(D)

(X) Not applicable. (D) Withheld to avoid disclosing figures for individual companies.

<sup>1</sup>Cost of crude ores and residues received for preparation was included in cost of all other supplies to avoid disclosing figures for individual companies.

<sup>2</sup>Total cost of supplies or fuels of establishments that did not report detailed supplies or fuels data, including establishments that were not mailed a form.

## APPENDIX A. Scope and Coverage

### INTRODUCTION

The 1977 Census of Mineral Industries is the 18th census of mining establishments in the United States. For 1977, it was conducted jointly with the censuses of manufactures, construction industries, retail trade, wholesale trade, and service industries under authority of title 13 of the United States Code. Title 13 specifies that a census of mineral industries be conducted every 5 years to cover years ending in "2" and "7".

### ESTABLISHMENT BASIS OF REPORTING

The census of mineral industries covers each mining establishment of firms with one paid employee or more operating in the United States. A firm operating more than one establishment is required to file a separate report for each location. Companies engaged in distinctly different lines of activity at one location are asked to submit separate reports if the company records permit such a separation and the activities are of significant size. This report includes figures for administrative offices, warehouses, storage facilities, and other auxiliary units servicing mining establishments.

For oil and gas field operations and contract services, reporting was somewhat different from the "establishment" reporting basis used for other types of mining. Every concern operating oil and gas wells, drilling wells for its own account or for others, or exploring for oil and gas was required to submit a separate report for each State or offshore area adjacent to each State in which it conducted such activities. Concerns which supplied contract services for mining establishments were required to submit one report covering all such activities in the United States.

### USE OF ADMINISTRATIVE RECORDS

From a universe of approximately 29,000 mining establishments in the 1977 Census of Mineral Industries, approximately 11,000 small single-establishment companies were excused from filing reports. Selection of the small establishment nonmail cases was done on an industry-by-industry basis. A variable cutoff was used to determine those establishments for which administrative records were to be used in place of a census report. The cutoffs were selected so that the administrative record cases would account for approximately 3 percent of the value of shipments for the industry. These cutoffs were then adjusted so that all single-establishment companies with less than 5 employees were excluded from the mail canvass, while all establishments with more than 10 employees were included. For the crushed stone and construction sand and gravel industries, where most establishments in the 5 to 20 employee size range were included in the mail canvass, an abbreviated census form was used.

For these nonmail establishments, estimates were made from payrolls and receipts data obtained from the administrative files of the Social Security Administration (SSA) and the Internal Revenue Service (IRS). The administrative records data were obtained under special arrangements which safeguarded the confidentiality of both tax and census records. Estimates for data other than payrolls and sales for these small establishments were developed from industry averages. The value of shipments and cost of materials were not distributed among specific products and materials for these establishments but were included in the product and material "not specified by kind" categories.

In the 1977 Census of Mineral Industries, as in the 1972 and 1967 censuses data for single-unit firms without paid employees were excluded. This exclusion has had only a slight effect on industry aggregates for most industries. Data for firms without employees were included in the 1963, 1958, and 1954 censuses if they reported more than \$500 in (1) value of shipments and receipts, (2) cost of supplies and purchased machinery, or (3) capital expenditures.

The industry classification codes included in the administrative records files were used for those establishments excused from filing census forms. Generally, these codes were assigned on the basis of brief descriptions of the general activity of the establishment. Where the description is incomplete, or where there are relatively fine lines of demarcation among industries or between mining and nonmining activities, the code assigned to an establishment could differ from that which would have been assigned on the basis of more complete product or activity information. Therefore, the total establishment count should be viewed as an approximation rather than as a precise measurement. The counts for establishments with 20 or more employees are far more reliable.

### VALUE OF SHIPMENTS FOR THE INDUSTRY COMPARED TO VALUE OF PRODUCT SHIPMENTS

In the census of mineral industries publications, value of shipments data are published for industries and products. Value of shipments figures shown in tables 1 and 2 represent the total value of shipments of all establishments classified in the particular industry. This figure includes the shipments of the products that are classified in the industry (primary to the industry), products classified in other industries (secondary to this industry), and miscellaneous receipts (repair work, sale of scrap, research and development, installation receipts, and resales). Product shipments shown in table 3 represent the total value of shipments of products classified as primary to this industry that were shipped by all mining establishments regardless of their industry classification.



## OTHER REPORTS IN THE CENSUS

More detailed figures for this industry will appear in the final census reports. Final reports will also include a comprehensive discussion of such concepts as "industry," "establishments," and "secondary production," as well as the various statistical items such as "employment" and "value added." Similar preliminary and final reports are being issued for other

industries. Preliminary summary reports are also being issued showing U.S. totals for industry and industry groups, and for each State. The final industry and area reports will be published during 1979.

Order forms describing these reports and their prices may be obtained from any U.S. Department of Commerce District Office or from the Subscriber Services Section (Publications), U.S. Bureau of the Census, Washington, D.C. 20233.

## APPENDIX B. Explanation of Terms

*(For a more complete discussion of these terms and the method of compiling the Census of Mineral Industries, see the Introduction to the 1972 Census of Mineral Industries, Subject, Industries, and Area Statistics)*

**All employees**—This item includes all full-time and part-time employees on the payrolls of operating mineral establishments for any part of the pay period ended nearest the 12th of the months specified on the report form. Included are all persons on paid sick leave, paid holidays, and paid vacation during these pay periods. Officers of the corporations are included as employees; proprietors and partners of unincorporated firms are excluded. The "all employee" number is the average number of production workers plus the number of other employees in mid-March. The number of production workers is the average of those for midmonth payroll periods of March, May, August, and November.

**Payroll**—This item includes all forms of compensation such as salaries, wages, commissions, dismissal pay, bonuses, vacation and sick leave pay, and compensation in kind, prior to such deductions as employees' Social Security contributions, withholding taxes, group insurance, union dues, and savings bonds. The total includes salaries of officers of these establishments, if a corporation; it excludes payments to the proprietor or partners, if an unincorporated concern. Respondents were told that in reporting they could follow the definition of payroll used for calculating the Federal withholding tax.

**Production, development, and exploration worker hours**—This item represents all hours that production, development, and exploration workers worked both on active days during which there was production or development work, and on inactive days when only watchmen, inspectors, repairmen, and other maintenance persons were on duty. It includes all hours worked or paid for at the mining operations, except hours paid for vacations, holidays, or sick leave, when the employee was not at the establishment. Included are actual overtime hours not straight-time equivalent hours. Hours of working proprietors or partners are excluded.

**Cost of supplies used, purchased machinery installed, etc.**—This cost includes supplies and purchased machinery installed, fuels and electric energy used, and contract work done by others for each establishment. It includes charges to both the current and capital accounts. It also includes the cost of items used during 1977 whether they were purchased, withdrawn from inventories, or received from other establishments of the company. For selected supplies and fuels and for electric energy, both quantity and cost data were requested. The cost data refer to direct charges actually paid or payable (after discounts) for items used during the year. Freight charges and other direct charges incurred by the establishment in acquiring the item are included. Where the company's records did not show actual amounts used, they were asked to approximate use by adding purchases (or receipts) during the year to opening inventory and subtracting closing inventory.

Separate figures were obtained for (a) selected supplies, minerals received for preparation, and purchased machinery installed; (b) electric energy purchased; (c) purchased fuels used for heat, power, or the generation of electricity; (d) contract work done by others; and (e) products bought and resold in the same condition. Supplies and equipment used in mine development, plant expansion, and capitalized repairs, which are chargeable to fixed assets accounts, were included as were supplies furnished without charge to contractors for use at the mining operation and supplies sold to employees for use at the establishment. No data on such costs as advertising, insurance, telephone, and research and consulting services of other establishments; or on overhead costs, such as depreciation charges, rent, interest, and royalties, were included in this item.

**Specific supplies used and minerals prepared**—In addition to the total cost of supplies, etc., and purchased machinery installed which every establishment was required to report, information was also collected on the consumption of major supplies used in mining. These inquiries were restricted to supplies which were important parts of the cost of production, exploration, and development of a particular industry and for which cost information was available from the firms' records. Information on the specific supplies consumed is shown in table 4.

On report forms for almost all mineral industries except the contract services industries, a uniform inquiry was included on minerals prepared at the reported establishments. Figures were obtained on minerals prepared from three sources: (1) Crude minerals mined at the establishment (quantity), (2) crude minerals received from other establishments of the company or purchased from others (quantity and cost), and (3) crude minerals received for preparation on a custom or toll basis (quantity and estimated value).

Establishments consuming less than a specified amount (usually \$10,000) were not requested to report separately the cost of a supply. Also, the cost of supplies for small establishments for which administrative records were used were imputed as "not specified by kind." (See appendix A for the importance of administrative records in the industry.)

**Capital expenditures**—This item covers expenditures made during the year for development and exploration of mineral properties, for new construction, and for purchased machinery chargeable to fixed assets accounts of the mineral establishment. They are the type for which depreciation, depletion, or Office of Minerals Exploration accounts are ordinarily maintained. Capital expenditures during 1977 were to be determined as "additions completed during the year plus construction in progress at the end of the year minus construction in progress at the beginning of the year." Reported capital expenditures were to include work done on contract as well as by the mine forces. Expenditures for machinery and equipment were to include



those made for replacement purposes, as well as those for additions to capacity. Excluded from these expenditures were costs of maintenance and repairs charged as current operating expense and expenditures for land and mineral rights.

Wherever applicable, separate figures were provided for expenditures for (a) development and exploration of mineral property, (b) construction of preparation plants and other construction, (c) new machinery and equipment, (d) used plant and (e) used equipment acquired from others.

**Value added in mining**—This measure of mining activity is derived by subtracting the cost of supplies used, minerals received for preparation, purchased machinery installed, purchased fuel, purchased electricity, and contract work from the sum of the value of shipments (mining products plus receipts for services rendered) and total capital expenditures. The result of the calculation is then adjusted by the addition of value added by merchandising operations (i.e., the difference between the sales value and the cost of merchandise sold without further processing).

This statistics avoids the duplication in value of shipments which results from the use of products of some establishments as supplies, energy sources, or materials by others. Moreover, it provides a measure of value added not only in mineral production but also in the development of mineral properties. For these reasons, it is considered to be the best value measure for comparing the relative economic importance of mining among industries and geographic areas.

**Value of shipments**—This item includes the values, f.o.b. mine, well, or plant (exclusive of freight and taxes), or all primary and secondary products shipped, as well as all miscellaneous receipts such as receipts for contract work performed for others, installation and repair, sale of scrap, and sale of products bought and resold without further processing. Included are all items produced by the establishments and sold, transferred to other plants of the same company, or shipped on consignment.

In the case of multiunit companies, the firm was requested to report the value of products transferred to other establishments of the same company at full economic or commercial value; i.e., including not only the direct costs of production but also a reasonable proportion of "all other costs" (including company overhead) and profit.

For industry and industry group totals, some duplication is introduced by the inclusion of materials transferred from one

establishment to another for mineral preparation. Wherever value of shipments is shown without further specification, it represents gross shipments.

**Shipments of individual products**—In the 1977 Census of Mineral Industries, information was collected on the output of about 200 individual mineral product items. In general, the figures of the 1977 and 1972 minerals censuses were confined to separate totals for each crude and each prepared mineral. Where significant, separate shipments figures were also obtained for crude minerals going to preparation plants and those going to consumers.

Figures were collected on both quantity and value of shipments. Shipments include commercial shipments and transfers of products to other operations of the same company. For products which are used to a significant extent within the same establishment for power or heat, and for minerals mined and prepared in the same establishment, total production or separate data on production for such uses were collected. Typically, production was also collected for products for which there are usually significant differences between total production and total shipments as a result of stock changes.

For service industries, the amount received or due for services performed during 1977 was collected as a measure of output. For mine operators who also perform services, the amount received for such services was added to the total value of products shipped to determine total value of shipments and receipts for each establishment.

Table 3 of the individual industry reports provides the national and State total shipments from all industries for each of the products primary to the industry covered in the report.

**Shipments and production**—Shipments figures include all products physically shipped from the establishment during 1977, including material withdrawn from stock-piles and products shipped on consignment, whether or not sold in 1977. Prepared material or concentrates include preparation from ores mined at the same establishment, purchased, received from other operations of the same company, or received for milling on a custom or toll basis. For products transferred to other establishments of the same company or prepared on a custom basis, the company was requested to include, in addition to direct costs of production, a reasonable proportion of company overhead and profits.

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